20-1-21/44

On the Possibility of Using Tritium in the Radiographic Investigation of the Distribution of Hydrogen in Titanium and Zirconium.

PRESENTED: By G. V. Kurdyumov, Academician, April 24, 1957.

SUBMITTED: April 22, 1957.

AVAILABLE: Library of Congress.

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BRUK, B. Ĭ.

"A Study on Re-Distribution of Elements in Metal Alloys and Weld Joints by Radiography and Radiometry", by B. Ĭ. Bruk, A. S. Zavyalov, and G. I. Kapyrin. Report presented at 2nd UN Atoms-for-Peace Conference, Geneva, 9-13 Sept 1958

ZAV'YALOV, A.S., prof., doktor tekhn.nauk; BRUK, B.I., kand, tekhn.nauk

Regularities of intercrystalline distribution of elements in metal alloys. Metallovedenie 2:35-52 '58 (MIRA 13:9)
(Alloys--Metallography) (Crystal lattices)

BRUK, B. I.

18(7)

PHASE I BOOK EXPLOITATION SOV/1838

Metallovedeniye; sbornik statey, [vyp.] 2 (Study of Metals; Collection of Articles, [Nr] 2) [Leningrad] Sudpromgiz, 1958. 265 p. 4,000 copies printed.

Resp. Ed.: G.I. Kapyrin, Candidate of Technical Sciences; Ed.: Ye. A. Krugova; Tech. Ed.: K.M. Volchok.

PURPOSE: This book is intended for metallurgists and metallurgical engineers.

COVERAGE: This is the second volume of collected scientific papers dealing with various problems in physical metallurgy, particularly in mechanical metallurgy and metallography. Topics covered include hydrogen embrittlement, intragranular distribution of elements in alloys, effect of tempering on carbon redistribution, use of tritium to investigate certain phenomena in metals, effect of certain alloying elements on temper brittleness and hardenability of steel, strength of notched specimens of brittle steel, effect of strain hardening on the properties of an aluminum alloy, etc. The articles are concerned mainly with various types of steel, though some deal with nonferrous alloys.

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the development of zones of disintegration and destruction of continuity, constitutes the main reason for the sharp drop in impact toughness and the intergranular character of the fracture. (4) The disintegration of former austenite grains may create favorable conditions for the concentration of alloying elements in the boundary zones. Because of the disappearance of the cohesive bonds between the alpha phase and the carbides separating out during this disintegration, the carbides will inevitably have a structure composed of nearly perfect crystals, a fact which was demonstrated in this investigation. (5) Lacquer films or similar films of amorphous structure are recommended for the electron-diffraction study of isolated particles of any second phase.

Bruk, B.I., Candidate of Technical Sciences, and V.V. Nyrkovskaya, Engineer. Redistribution of Carbon During the Tempering of Chrome-Nickel Stainless Steel 65

Author's conclusion. Application of the autoradiographic method made it possible to demonstrate certain regularities in the redistribution of carbon in 18-8 stainless steel during tempering. In particular it was established that holding this steel for 6 hours at 600° C may lead to the formation of a zone rich in carbon along the boundaries of austenite grains having a width of the order of $5 \cdot 10^{-5}$ mm. This zone, depending on the amount of carbon accumulated in it, is equivalent to a boundary layer about 10^{-4} mm. in thickness. The amount of carbon diffusing to the austenite grain boundaries in this kind of tempering constitutes a few thousandths of the total quantity of carbon in the grain. Lengthening the period of tempering at 600° results in a more intensive diffusion of carbon, whose concentration at the grain boundaries causes a deep blackening clearly distinguishable on the autoradiograms. The radiographic method graphically demonstrates the fact that the presence of titanium in stainless steel in amounts exceeding four times the quantity of carbon leads to a marked slowing-down of the diffusion of carbon and to the separation of carbides of chromium along the austenite grain boundaries.

Nikolayev, G.I., Engineer, and B.I. Bruk, Candidate of Technical Sciences. Application of Tritium in the Investigation of Some Metallurgical and Metallophysical Questions 74

The authors take advantage of the radioactive nature of tritium to investigate the solubility of hydrogen in iron, the distribution of

BRUK, B.I., kand.tekhn.nauk

Studying the distribution of elements in weld joints by means of X rays. Svarka 1:27-37 '58. (MIRA 12:8)
(Welding--Testing) (X rays--Industrial applications)

18(7) PHASE I BOOK EXPLOITATION SOV/2697

Bruk, Boris Il'ich

Radioaktivnyye izotopy v metallurgii i metallovedenii svarki (Radioactive Isotopes in the Metallurgy and Metallography of Welding) Leningrad, Sudpromgiz, 1959. 231 p. 4,000 copies printed.

Scientific Ed.: O.N. Zhukov; Ed.: R.D. Nikitina; Tech. Ed.: L.M. Shishkova.

PURPOSE: This book is intended for engineers and scientists concerned with the physical metallurgy of welding, and for advanced students specializing in this field.

COVERAGE: The book is concerned with the use of radioactive tracers in solving specific problems of arc welding. Principles of using tracers in the investigation of processes occurring during welding are explained. This discussion is preceded by basic data on radioactivity, methods of measuring it, and radiographic examination of metals. Methods of introducing radioactive substances into the base metal, the added metal, electrode coverings, and fluxes are described. Data are given on laboratory equipment and facilities. Safety precautions and instructions for working with radioactive materials are included. Acknowledgements are made by the author to his coworkers A.T. Osipov, V.I. Zaytsev, V.V. Nyrkovskaya, and M.V. Demchenko for their participation in basic experimental work. There are 129 references: 108 Soviet, 17 English, and 4 French.

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BRUK, B.I.

(4) PHASE I BOOK EXPLOITATION SOV/2713

International Conference on the Peaceful Uses of Atomic Energy. 2nd, Geneva, 1958

Doklady sovetskikh uchenykh; polucheniye i primeneniye izotopov (Reports of Soviet Scientists; Production and Application of Isotopes) Moscow, Atomizdat, 1959. 388 p. (Series: Its: Trudy, vol. 6) 8,000 copies printed.

Eds. (Title page): G.V. Kurdyumov, Academician, and I.I. Novikov, Corresponding Member, USSR Academy of Sciences; Ed. (Inside book): Z.D. Andreyenko; Tech. Ed.: Z.D. Andreyenko.

PURPOSE: This book is intended for scientists, engineers, physicians, and biologists engaged in the production and application of atomic energy to peaceful uses; for professors and graduate and nongraduate students of higher technical schools where nuclear science is taught; and for the general public interested in atomic science and technology.

COVERAGE: This is volume 6 of a 6-volume set of reports delivered by Soviet scientists at the Second International Conference on the Peaceful Uses of Atomic Energy held in Geneva from September 1 to 13, 1958. Volume 6 contains 32 reports on: 1) modern methods for the production of stable radioactive isotopes and their labeled compounds, 2) research results obtained with the aid of isotopes in the field of chemistry, metallurgy, machine building, and agriculture, and 3) dosimetry of ionizing radiation. Volume 6 was edited by: S.V. Levinskiy, Candidate of Medical Sciences; V.S. Prusakov, Candidate of Chemical Sciences; and V.V. Sedov, Candidate of Medical Sciences. See Sov/2081 for titles of volumes of the set. References appear at the end of the articles.

BRUK, B. I.

PHASE I BOOK EXPLOITATION SOV/3752

Metallovedeniye; sbornik statey, No. 3 (Physical Metallurgy; Collection of Articles, No. 3), Leningrad, Sudpromgiz, 1959. 390 p. 3,200 copies printed.

Ed.: G. I. Kapyrin, Candidate of Technical Sciences; Literary and Tech. Ed.: N. I. Doronenko.

PURPOSE: This collection of articles is intended for scientific personnel at research and educational institutions and industrial plants and also for advanced students.

COVERAGE: The articles report the results of investigations of 1) the effect of various factors on the susceptibility of constructional and heat-resistant steels and titanium alloys to brittle failure at various temperatures under various conditions of loading (long-time, short-time, cyclic, noncyclic) 2) alloying, structure, and condition of alloys as related to their mechanical properties, and 3) corrosion resistance and evaluation of stainless and heat-resistant steels. The articles are accompanied by numerous Soviet and non-Soviet references. No personalities are mentioned.

AVAILABLE: Library of Congress

(2)

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7-20-60

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SOV/129-59-2-5/16

AUTHORS: Bruk, B.I. and Nyrkovskaya, V.V.

TITLE: Redistribution of Carbon in a Chromium-nickel Steel Studied by Means of Radioactive Tracers (Pereraspredeleniye ugleroda v khromonikelevoy stali metodom radioaktivnykh izotopov)

PERIODICAL: Metallovedeniye i Termicheskaya Obrabotka Metallov, 1959, Nr 2, pp 22 - 28 (USSR)

ABSTRACT: By means of C_6^{14} certain relations governing the redistribution of carbon in chromium-nickel stainless steel during tempering are studied. Exposures produced by means of such radiation from a steel specimen will show the most intensive darkening in spots in which the concentration of the carbon content exceeds the average values throughout the specimen. In Figure 1, two photographs are reproduced, one representing the microstructure and the other the radiation pattern (for a specimen of the steel U12). It can be seen that the preferential darkening in the radiation pattern corresponds to the locations of secondary cementite. In austenitic chromium-nickel steels, the carbon-enriched grain

Redistribution of Carbon in a Chromium-nickel Steel Studied by Means of Radioactive Tracers

boundaries should come out very clearly in radiation photographs because the average carbon concentration in the grain, which forms the background of the radiographic picture, does not exceed 0.1%, whilst for the steel U12 as a whole, it reaches 0.8 to 0.9%. Tests were carried out on steel specimens containing 19.3% Cr, 10.1% Ni, 0.07% C. A radiographic picture of the specimen after annealing at 950 °C followed by cooling to 500 °C in steps of 50 °C/h is reproduced in Figure 2; this shows sections of preferential darkening which obviously correspond to locations of chromium-carbide. It can be seen from Figure 3 that after quenching from 1 100 °C, the investigated steel will show a uniform carbon distribution. Hardening followed by tempering for six hours at 600 °C yields the same darkening as is obtained after only hardening at 1 100 °C (see Figure 4). The reasons for this are studied in some detail. The following conclusions are arrived at: 1) tempering of type 18-8 steel for 6 hours at 600 °C can result in enrichment with carbon of the zone around the boundaries

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Redistribution of Carbon in a Chromium-nickel Steel Studied by Means of Radioactive Tracers

of the austenitic grain of a width not exceeding 2×10^{-5} mm. As regards the quantity of accumulated carbon, this zone is equivalent to a 10^{-4} mm thick boundary layer of the steel; the quantity of carbon which diffuses towards the boundaries of the austenitic grain during such tempering amounts to several thousandths of the total quantity of the carbon in the grain;
2) increase of the tempering duration at 600 °C leads to a more intensive diffusion of the carbon which is concentrated at the boundaries of the austenitic grain and brings about formation of clearly differing sections with an increased degree of darkening;
3) the results obtained by means of autoradiography confirm that the presence in stainless steel of titanium in quantities exceeding four times the respective carbon concentration leads to a sharp braking of the diffusion of the carbon and of the process of isolation of chromium carbides.

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Redistribution of Carbon in a Chromium-nickel Steel Studied by Means of Radioactive Tracers

There are 8 figures and 5 references, 4 of which are Soviet and 1 English.

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BRUK, B.I., kand.tekhn.nauk; AVDEY, G.M., inzh.

Carbon diffusion in the fusion zone of dissimilar steels and its effect on the mechanical properties of welded joints. Svarka 2: 29-46 '59. (MIRA 14:5)

(Steel—Welding) (Diffusion)

BRUK, B.I., kand.tkehn.nauk; ZAV'YALOV, A.S., doktor tekhn.nauk, prof.;
KAPYRIN, G.I., kand.tekhn.nauk

Studying the redistribution of elements in metal alloys and welded joints by the method of autoradiography and radiometry. Metallovedenie 3:314-325 '59. (MIRA 14:3)
(Metallography) (Autoradiography)
(Radioisotopes—Industrial application)

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18.9200, 18.1000

SOV/126-8-3-6/33

AUTHORS: Zav'yalov, A.S. and Bruk, B.I.

TITLE: On the Factors Determining the Distribution of Elements Within Metallic Alloy Crystals

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 3, pp 349-361 (USSR)

ABSTRACT: The authors have carried out a calculation of the minimum thickness of the layer enriched in radioactive carbon along the austenitic grains capable of forming a preferential blackening zone on a photographic emulsion (Ref 5). The calculation has shown that in the case of the normally applied fresh photographic emulsions and the normal exposures and concentrations of radioactive carbon in the alloy, the minimum thickness of such a layer does not exceed 10^2 - 10^3 interatomic distances. The effectiveness of the application of the radiographic method to the study of the nature of distribution of impurities in iron alloys increases considerably if work is carried out in which a radioactive isotope of carbon is used. The reason for this is not only that the low energy of the β-spectrum of the C^{14} isotope enables sufficiently clear radiographs to be obtained but also

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that the distribution of carbon in iron alloys is closely associated with the distribution of alloy elements. For instance, carbon tends to segregate in alloy zones which are enriched with carbide-forming elements, which can be seen from the radio-autograph shown in Fig 1, taken from a bimetallic specimen, tempered at 600°C, containing radioactive carbon. Fig 2 shows the microstructure of carbon steel containing 0.21% C after its surface had been saturated with silicon for 30 hours at 1050°C. Fig 3 shows the microstructure of a carburized layer of steel containing 4.4% silicon which had been slowly cooled after carburization. Fig 4 shows the distribution of carbon in an iron alloy containing 19.5% Si: a - optical exposure, b - radio-autograph. Fig 5 shows the distribution of carbon in an iron alloy containing 9.2% W: a - optical exposure, b - radio-autograph. Fig 6 shows the distribution of carbon in an iron alloy containing 1.9% W (radio-autograph). Fig 7 shows the distribution of carbon in an iron alloy containing 15% Mo: a - optical exposure,

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b - radio-autograph. Fig 8 shows the microscopic distribution of carbon in an iron alloy containing 4.4% Si (radio-autographs): a - slowly cooled from 970°C, b - quenched from 950°C and B - quenched from 1200°C and tempered at 590°C for 10 hours. Fig 9 shows the distribution of carbon in un-alloyed iron containing 0.035% C after quenching from 1200°C and tempering at 590°C for 10 hours (radio-autograph). Fig 10 shows the microscopic distribution of carbon in iron alloys containing 15% Mo (radio-autograph): a - slowly cooled after crystallization, b - quenched from 1250°C, B - quenched from 1250°C and tempered at 800°C for 15 hours. Fig 11 shows the microscopic distribution of carbon in iron alloys containing 12% W (radio-autographs): a - slowly cooled after crystallization, b - quenched from 1250°C, B - quenched from 1250 and tempered at 800°C for 15 hours. The authors arrived at the following conclusions: The experimental data given in the present article and in papers by Zav'yalov et alii (Ref 5 and 6) testify to the fact that the following general mechanisms

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operate in the distribution of elements in metallic alloys: 1. If at a given temperature the element content does not exceed its limiting solubility in the solvent metal, then this element is distributed throughout the crystal body relatively evenly and does not exhibit a tendency to preferential segregation along the periphery or centre of the crystal. 2. If the element content at a given temperature exceeds its limiting solubility in the solvent metal, then the excess of this element will segregate along the alloy crystal boundaries in the form of a phase enriched with the given element or in a structurally free state. If the temperature of the alloy is changed its components, in accordance with the equilibrium diagram, can either concentrate in the grain boundary zones (if the limiting solubility of the element decreases) or they can distribute themselves within the crystal more evenly (if the solubility of the element increases). 3. If a one-phase alloy has reached a stage, as a result of change in temperature or concentration conditions, which precedes

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separation of a new phase, then those components of the alloy concentrate along the grain boundaries of this alloy or along the boundaries of finer crystal formations, e.g., mosaic blocks, with which the precipitating phase has become enriched. 4. The presence in the alloy of some elements exerts an influence on the distribution within the crystals of other elements. 5. The investigation carried out shows that when considering the grain boundary layers of multi-atomic thickness it is not possible to assume that some elements are horophilic and others horophobic with respect to the solvent metal (horophilic elements are those which lower the surface energy of phases, horophobic elements are those which raise it). The tendency of the components of metallic alloys to segregation along grain boundaries, or to diffusion from the peripheral to the central layers of the grains, cannot be determined by any constant property of a given element in relation to the solvent element but it can from the relationship between the concentrations of components in alloys at a given temperature, which can be found from the

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equilibrium diagram. In systems of more than two components, this relationship can also be found from the difference in the bond forces between the elements forming a given alloy. In accordance with the equilibrium diagram of a given alloy, the same element in various temperature ranges and at various component concentrations of a one-phase system can segregate preferentially either in the surface layers or in the centres of crystals. There are 11 figures and 6 Soviet references.

SUBMITTED: August 6, 1958

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24(4) SOV/32-25-2-29/78

AUTHOR: Bruk, B. I.

TITLE: On the Methodology of Relative Measurements of the Radioactivity of Metal and Slag Samples (K metodike otnositel'nykh izmereniy radioaktivnosti prob metalla i shlaka)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 2, pp 184 - 185 (USSR)

ABSTRACT: In the case of relative radioactivity measurements the effects of the chemical composition and density of metals and slags on the β-radiation must necessarily be considered. The method of determining this correction coefficient with radiations of the isotope S^{35}_{16} is described. The low-carbon-content steels 10 and 30, stainless austenite steel (20% Cr 12% Ni), acid silicate slags (95% SiO_2), basic calcareous slags (appr. 70% CaO) and a slag consisting of 30% CaO, 16% SiO_2, 14% Al_2O_3, 9% MgO, 22% Fe_2O_3 and 9% Cr_2O_3 were used as samples. The radiation of the isotope-containing samples was recorded by a unit of the type B with an end-window counter T-20. Engineer M. V. Demchenko participated in the

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On the Methodology of Relative Measurements of the Radio- SOV/32-25-2-29/78
activity of Metal and Slag Samples

experiments. According to the experiments the correction coefficient ranges from 1.28 to 1.37. Investigations of powdered samples showed that the radiation properties of compact and powdered samples of the same composition are different, a fact which has to be taken into consideration. The same is true of the differences in the absorption and dispersion of the radiation. The radiation intensity of powdered samples depends not only on the density of the sample but also on atomic number of the element.

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18(3)

AUTHOR: Bruk, B. I. SOV/20-128-4-20/65

TITLE: The Use of the C^{14} Isotope in Determining the Solubility of Carbon in Alpha Iron

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 4, pp 709-712 (USSR)

ABSTRACT: The values of solubility at eutectic temperature obtained up to now with different experimental methods are in a wide range of concentration from 0.01 to 0.15 to 0.18% (V. N. Gridnev, Ye. F. Petrova et.al., E. Z. Kaminskiy, M. P. Arbuzov, Ye. G. Ayzentson, B. N. Finkel'shteyn, L. F. Usova, and several non-soviet authors , Refs 1-19). This ambiguity is also caused to a known measure by the uncertainty of the conception of solubility when applied to carbon and α-iron. If the solubility of the carbon in α-iron is not dependent on the concentration of carbon-atoms (or ions) in the usual interatomic interval, but depends on defects in the lattice, then the multiplicity of the values of solubility can be explained by the ununiform degree of incompleteness of the lattice in the specimens of different origin. There is additionally a possibility that in the defects of the lattice

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(depending on their dimensions) not only carbon atoms but also atom-groups can accumulate, which cause accumulations of graphite or cementite. As criterion for the ratio (solved carbon / carbon concentrated in the lattice defects) first of all the diffusibility of the carbon in α-iron has to serve, as only atoms which are in a stable solution, can move in a crystal lattice. The author's method for determining the solubility of carbon in α-iron is based on this assumption. The solubility of the carbon was determined at temperatures of 620, 640, 680, and 700°, and Armco iron was used (0.05% C; 0.19% Si; 0.11% Mn; 0.21% Cu; 0.009% P; 0.028% S). C^{14} was introduced into the iron during the melting. This method made it possible to determine the concentration of the carbon in the stable solution by layer-wise analysis and by autoradiography. A figure shows a typical radiogram on which the surface layer of the formed stable solution is well observable (during the "bonding" of the carbon by the chromium coating and by subsequent saturation of the α-iron with carbon from the inner range of the sample).

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A diagram gives the radiometric and photometric curves for four different temperatures. The mean solubility value of the carbon in ferrite is at 700°, 0.028%, at 680° the solubility is 0.024%, and at 640 and 620° it is 0.017% and 0.014%. These values give the precise position of the PQ-line in the diagram iron - carbon. In the presence of carbide-forming elements the concentration of the carbon in the α-stable solution drops far below the effective limit of solubility. Apparently the concentration of the carbon in α-iron is determined by the difference between the linkage force of the iron atoms and the atoms of carbide-forming elements and the atoms of the carbon. An interesting phenomenon is the extraordinarily intensive increase in the ferrite granules at the removal of the carbon from the Armco-iron. The described method for the determination of the solubility of carbon is suitable for investigations of the solubility of carbon in alloyed ferrite, and for determining the influence of the alloying elements on the concentration of the carbon in the α-iron. There are 4 figures and 21 references, 8 of which are Soviet.

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The Use of the C^{14} Isotope in Determining the Solubility of Carbon in Alpha Iron

SOV/20-128-4-20/65

ASSOCIATION: Institut metallofiziki Tsentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii (Institute of Metal Physics of the Central Scientific Research Institute for Ferrous Metallurgy)

PRESENTED: May 23, 1959, by G. V. Kurdyumov, Academician

SUBMITTED: May 20, 1959

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85380

18.9200 also 2708, 2208

S/032/60/026/010/008/035
B016/B054

AUTHOR: Bruk, B. I.

TITLE: A Method of Investigating the Interfacial Redistribution of Carbon in Steels 18

PERIODICAL: Zavodskaya laboratoriya, 1960, Vol. 26, No. 10, pp. 1115-1118

TEXT: One of the possible ways of investigating the redistribution of carbon among the ferrite-cementite and austenite microsections is the establishment of artificial boundaries between macroscopic phase volumes. Such a boundary resembles the interface in the structural microvolumes. Thus, it is possible to avoid methodical difficulties arising due to the small size of interacting heterogeneous volumes in the structure of real alloys. Such an artificial boundary can be produced by electric welding (arc or contact welding) of the alloys to be investigated (Ref. 1). The surface of the unmolten metal portion where crystallization begins serves as an anisotropic base for the crystallizing liquid. The formation of two-dimensional nuclei of a new phase and their growth take place according to

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the principle of orientational and dimensional correspondence. As a consequence, the greatest similarity with respect to the position of atoms is ensured at the touching faces of the old and the new phase. In the case of phase isomorphism, the crystals, on the faces of which new crystals were formed, are "continued" by the latter. The resulting interface does not differ from that of a natural metallic polyphase system. Fig. 1 shows an autoradiogram (a) and an optical photograph (b) for the combination of metals formed by multiple arc welding. Hence it appears that the growing crystals "grow" through several welded walls without any noticeable distortion of their shape at the former interface between the solid and the liquid phase. The method suggested can be used to study the redistribution of carbon among the phases in ferroalloys with a heterogeneous structure. Fig. 2 shows autoradiograms for the combination of plain low-carbon steel with alloys: Fe + 8% Mn (a) and Fe + 10% Cr (b). On the basis of the phenomena observed, it is possible to formulate more accurately the modern concepts of the mechanism of the effect of carbide-forming elements on the rate of coagulation of the carbide phase in steel. Fig. 3 shows autoradiograms for a bimetallic combination in which the

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low-carbon steel contacts a ferronickel alloy (Fe + 23% Ni; without carbide-forming elements). By annealing such samples at 600 and 800°C, the carbon is intensively redistributed toward the alloyed component, although the latter contains no chromium. At 1000°C, this effect is missing (Fig. 3 v). The author supposes that there is a factor responsible for the passage of carbon from the α-phase into the γ-phase. Evidently, this factor produces a field of stress which causes an "ascending diffusion" of carbon (Ref. 10). This stress is caused by the different temperatures of the critical points of the fused metals. Thus, the polymorphous transformations are not simultaneous, and this circumstance effects tensile stresses in the γ-phase, and compressive stresses in the α-phase. There are 3 figures and 13 Soviet references.

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BALANDIN, Yuriy Fedorovich; MARKOV, Vadim Georgiyevich; BRUK, B.I., kand. tekhn. nauk, retsenzent; BYTENSKIY, I.A., nauchnyy red.; NIKITINA, R.D., red.; SHISHKOVA, L.M., tekhn. red.

[Structural materials for power plants with liquid metal heat exchangers] Konstruktsionnye materialy dlia ustanovok s zhidkometallicheskimi teplonositeliami. Leningrad, Gos. soiuznoe izd-vo sudostroit. promyshl., 1961. 205 p. (MIRA 15:3)

(Corrosion resistant materials)
(Heat exchangers) (Liquid metals)

S/180/61/000/001/006/015
E071/E433

AUTHOR: Bruk, B.I. (Leningrad)

TITLE: Redistribution of Carbon in Iron Alloys With Mixed Ferrite-Austenite Structure

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1961, No.1, pp.78-86

TEXT: The mechanism of the redistribution of carbon between microvolumes of steel differing in composition and the type of the crystal lattice was investigated. The alloys were joined together by electric arc welding. The distribution of carbon was determined and recorded by the autoradiographic method after preliminary introduction of the radioactive isotope C^{14} into the alloys. In this way the carbon redistribution processes which take place in microvolumes of real alloys during phase transformations were simulated on a macroscopic scale. The following cases were studied. 1) The behaviour of carbon in iron alloys with a non-uniform distribution of carbide forming elements. This was done on a bimetallic specimen consisting of non-alloy low carbon steel and austenitic steel Х22Н15 (Kh22N15). The specimen was radiographed in the initial state and after retention at 650 and 1200°C, with

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subsequent cooling in water (radiographs are shown in Fig.1).
2) Interphase redistribution of carbon in iron-nickel alloys. Bimetallic specimens consisting of non-alloy low carbon steel and iron-nickel austenite (Fe + 23% Ni), heated at 500, 800 and 1000°C (radiographs - Fig.3a,б,в,г) and with nickel-iron alloy containing 3.2% of nickel, at the same temperatures, (Fig.3д, e,ж,з). The structure of the contact zones of non-alloyed steel with iron-nickel alloys (with 23 and 3.2% Ni, Fig.5a and 5b) after retention at 800°C is shown in Fig.5 and the change in the microhardness is plotted in Fig.6.
3) Redistribution of carbon between ferrite and austenite in non-alloyed steel. Bimetallic specimens were prepared from steel containing 0.1% and 1.08% of carbon.
It is concluded that:
1) The diffusion redistribution of carbon between microvolumes differing as regards the chemical composition is possible. If these microvolumes are characterized by non-equality of concentrations of a carbide forming element and the temperature of the alloy does not exceed the temperature of dissolution of carbides, then the diffusion of carbon leads to the precipitation of a carbide
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phase and is localized in a thin layer at the boundary. If the temperature is such that the existence of a carbide phase is impossible (due to its dissociation) then, due to the inequality of its bond strength in crystal lattices of the contacting volumes, carbon is transferred from a less alloyed volume to a more alloyed one and is distributed uniformly in the latter.

2) An intense redistribution of carbon can also take place between microvolumes of an alloy containing no carbide forming elements but differing in the type of crystal lattice. In this case, carbon is transferred from zones with space centred lattice to zones with a face centred lattice. "The moving force" of the above redistribution is the unequal solubility of the carbon in ferrite and austenite, as well as tensile stresses in layers of austenite adjoining the interphase contact boundary at the moment of transformation (these are caused by inequality of the specific volumes of the phases). If the first factor is prevalent, carbon has a tendency to a uniform distribution through the entire austenitic macrovolume. If the second factor plays a more important role, the carbon will concentrate directly on the phase boundary (from the side of austenite), since volumes of

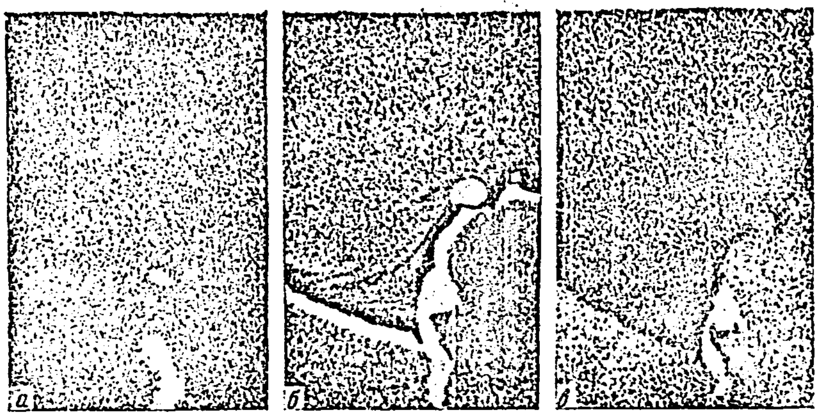

Fig.1. Autoradiographs of a bimetallic specimen consisting of unalloyed steel with 0.2% C (bottom) and steel Kh22N15 (top) a - initial state, б - after holding at 650°C, в - after holding at 1200°C (x20).

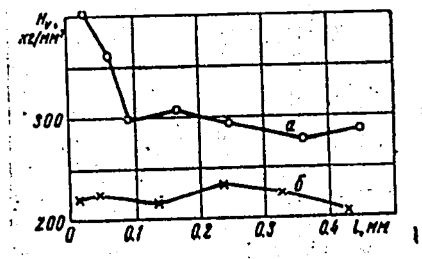

Fig.6. Change in the hardness of boundary sections of iron-nickel alloys after holding bimetallic specimens at 800°C;
H_v, kg/mm^2 versus ℓ, mm.
Curve a - alloy of iron with 23% Ni; Curve б - alloy of iron with 3.2% Ni; ℓ - distance from the division boundary.

S/126/61/011/001/008/019
E111/E452

AUTHOR: Bruk, B.I.

TITLE: Mechanism of the Coagulation of the Carbide Phase in Steel

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.1, pp.74-85

TEXT: Agreement has not yet been reached on the role of alloying elements in carbide coagulation in steel. Some authors attribute the effect to the influence of alloying elements on the carbon diffusion coefficient in ferrite, others maintain that the main influence is on carbon bonding force in alloyed cementite or special carbide, affecting carbon transfer over the ferrite-carbide phase boundary. The author has shown (Ref.29-33) that the effects can be separated by creating an artificial "macroscopic" boundary. For this, a bimetallic specimen of unalloyed carbon steel and steel alloyed with the carbide-forming element being studied is heated below A_1. The author describes his work with this technique, in which carbon redistribution was registered autoradiographically. The specimens consisted of 0.1% C plain carbon steel and steel with 0.1% C and 10.5% Cr. Photometry of

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S/126/61/011/001/008/019
E111/E452

Mechanism of the Coagulation of the Carbide Phase in Steel

autoradiograms shows that for the whole 1 mm thick decarburized zone the carbon concentration is below 10^{-3} to 10^{-4}%; but when the chromium-containing layer was removed before high-temperature holding this was 0.014 to 0.028% (at 620 to 700°C). When a manganese (8% Mn) steel was used instead of the chromium steel a higher and graded carbon content was observed in the decarburized layer. As expected, the depth of the ferrite layer in the bi-metallic specimens increased more slowly at 500°C (tending to 0.25 mm) than at 640°C (tending to 0.65 mm). The author discusses his own and some published observations on the role of carbide-forming elements in the coagulation process and factors influencing the carbon concentration gradient. He concludes that the different effect of manganese to chromium is a consequence of the fact that with the latter the sharp fall in the carbon concentration in the alpha-phase limits the concentration difference between dissolving and growing carbides. The reduced carbon content in the ferrite retards carbon diffusion. These effects were found when there were no alloying elements in the ferrite. Consequently, the facts can be

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S/126/61/011/001/008/019
E111/E452

Mechanism of the Coagulation of the Carbide Phase in Steel

explained only by the greater bonding strength of carbon in complex (or special) carbide compared with that in cementite. Thus, it can be stated that the decrease in carbide coagulation intensity in steel alloyed with carbide-forming elements is due both to reduction in diffusion coefficient and the greater bonding strength in the carbide lattice, reducing the carbon concentration in the ferrite. Both factors must be considered. Sometimes the reduction in coagulation intensity can be explained by the higher alloying of the small carbide crystals (separating earlier) compared with larger. This must lead to a decrease in carbon concentration in ferrite regions in contact with fine carbide particles and, consequently, to equalization or even change in sign of the carbon concentration gradient between fine and coarse precipitated carbides. The importance of this factor is determined by the extent to which the martensite decomposition and redistribution of carbide-forming elements between the alpha solid solution and the carbide phase "cover" each other during tempering. There are 9 figures and 33 Soviet references.

SUBMITTED: April 10, 1960

34842
S/129/62/000/003/003/009
E021/E335

18.7500

AUTHORS: Bruk, B.I., Candidate of Technical Sciences and
Zav'yalov, A.S., Doctor of Technical Sciences,
Professor

TITLE: Redistribution of carbides as a form of structural instability of steel

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, no. 3, 1962, 14 - 18

TEXT: The structural instability of the following steels was studied by autoradiography, using C_{14} as the indicator:

	C	Cr	Mo	V	Si	Mn	Ni
1Х19Н10(1Kh19N10)	0.07%	19.3	-	-	0.30	0.22	10.1
1Х15Н25М5*(1Kh15N25M5)	<0.12	15-17.5	5.5-7	0.1-0.2	0.5-1	1-2	24-27
10ХМФ (10KhMF)	0.07	1.6	0.88	0.23	0.23	0.30	-
10ХМФС3(10KhMFS3)	0.06	1.6	0.89	0.22	2.7	0.32	-

* Standard composition.

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E021/E335

Redistribution of ....

Microphotographs showed that when the high-chromium steel 1Kh19N10 is held at 600 °C for 100 hours and especially for 1 000 hours the carbon shows up in the austenite grain boundaries. The presence of carbide-forming elements in the steel retards the redistribution of the carbide phase. Holding the 10KhMF steel for 1 000 °C at 340, 500 or 650 °C resulted in no marked localization of carbon. The presence of non-carbide-forming elements led to intensive redistribution of the carbides in the grain boundaries; this is illustrated by microphotographs of the 10KhMFS3 steel containing 2.7% Si. Thus, the intensifying action of 2.7% Si is greater than the retarding action of 1.6% Cr + 0.89% Mo + 0.22% V. The redistribution of carbon in the pearlitic steel containing Cr, Mo, V and Si is more intensive at 350 and 500 °C than at 650 °C. This is because at the lower temperature the mobility of atoms in the grain boundaries is much greater than the mobility within the grains. With increase in temperature the difference in mobility in the boundary and in the grain becomes smaller. In addition to this, at higher temperatures

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Redistribution of S/129/62/000/003/003/009
E021/E335

carbides of the cementite give way to stronger carbides, the solubility of which is small in α-iron. There is also a decrease in the quantity of the carbide phase at higher temperatures because of the increase in solubility of carbon in α-iron. There are 6 figures and 1 table.

Card 3/3

X

S/659/62/009/000/008/030
I003/I203

AUTHORS: Bruk, B. I. and Zav'yalov, A. S.

TITLE: Redistribution of carbides as one of the forms of structural instability of ferrous alloys

SOURCE: Akademiya nauk SSSR, Institut metallurgii. Issledovaniya po zharoprochnym splavam v. 9. 1962. Materialy Nauchnoy sessii po zharoprochnym splavam (1961 g.), 60-66

TEXT: The movements of the excess phase (in this case the carbide phase) towards the grains boundaries is one of the forms of structural changes rarely mentioned in the literature. Structural changes taking place on heating of ferric and austenitic steels 1 × 19H10(1Kh19N10), 1 × 15H25M5(1Kh15N25M5)10 × MΦ(10KhMF) 10 × MΦC3 (10KhMFS3) to various temperatures were investigated by using the C^{14} isotope as a radioactive indicator. The photomicrographs taken show that a concentration of the excess phase may take place along the grain boundaries and crystal planes. The presence of the cabide-forming elements in constructional steels inhibits the movement of the above phases towards the grain boundaries during prolonged heating In a Cr-Mo-V-Si perlitic steel such a process takes place most rapidly in the range of temperatures from 350° to 500°C. The data on the temperature range and on the kinetics of the process of redistribution of carbides in steel, obtained in this work clarify the nature of the process by which the steels become brittle when subjected for a long time to high temperatures. There are 6 figures and 1 table

Card 1/1

BRUK, B.I.(Leningrad); GRISHMANOVSKAYA, R.N.(Leningrad); MARKOV, V.G.(Leningrad)

Interaction between dissimilar steels in liquid tin. Izv. AN SSSR.Otd. tekh.nauk. Met. i topl. no.5:212-219 S-O '62. (MIRA 15:10)
(Steel, Structural--Metallography)
(Tinning)

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000307110011-7"

PETROV, Georgiy L'vovich; BRUK, B.I., kand. tekhn. nauk, retsenzent; TIMOFEYEV, A.N., inzh., retsenzent; DEMYANTSEVICH, V.P., kand. tekhn. nauk, nauchnyy red.; OSVENSKAYA, A.A., red.; KRYAKOVA, D.M., tekhn. red.

[Inhomogeneity of the metal in welded joints]Neodnorodnost' metalla svarnykh soedinenii. Leningrad, Sudpromgiz, 1963. 205 p. (MIRA 16:3)

(Welding--Testing) (Metallography)

S/126/63/015/003/008/025
E193/E383

AUTHORS: Zav'yalov, A.S. and Bruk, B.I.

TITLE: Redistribution of components of solid solutions preceding their decomposition

PERIODICAL: Fizika metallov i metallovedeniye, v. 15, no. 3, 1963, 379 - 390

TEXT: In continuation of their earlier work (Metallovedeniye, Sb. statey, no. 2, Sudpromgiz, Leningrad, 1958, 35), concerned with the Fe-Cr, Fe-W and Fe-Si systems, the authors studied the temperature- and concentration-dependence of the homogeneity of composition of Fe-Mo alloys. The object of the investigation was to obtain additional evidence that side-by-side with short-range fluctuations of the concentration of solid solutions, concentration gradients may persist for an indefinite time in certain temperature and composition ranges. The experiments were conducted on six Fe-Mo-C alloys which, in view of the very low carbon content, could be regarded as binary Fe-Mo solid solutions; the composition of these alloys is given in a table. Radioactive C^{14} was used in the preparation of the alloys which, after quenching followed by

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annealing at various temperatures, were examined by the autoradiographic technique. This method revealed a change in the distribution of C only, it being taken for granted that an increase in the C concentration would also indicate a corresponding increase in the concentration of Mo. The results indicated that in the case of alloys with relatively low Mo content, prolonged annealing at certain temperatures brought about an increase in the Mo concentration in the grain-boundary regions. In the alloys with a high (14-15%) Mo content this effect was observed also in quenched specimens. The experimental results are summarized in Fig. 3, where the line c-d represents the temperature-dependence of the onset of C and Mo enrichment of the grain boundaries in Fe-Mo-C alloys, curve a-b representing the boundary between the single α-phase and heterogeneous (α + ε) regions in the Fe-Mo system. The region between curves c-d and a-b represent conditions of temperature and concentration under which the Mo atoms can concentrate at the grain boundaries as a result of diffusion in solid solutions which, although not leading to the formation of a new phase, brings about the formation of complexes or aggregates of dissimilar atoms with a Mo content higher than that determined by

S/126/63/015/003/008/025
E193/E383

Redistribution of components ....

the solubility curve of saturated solid solutions. Conclusions - 1) The effects observed in the course of the present investigation should be regarded as localized concentration of a component in a solid solution, preparatory to decomposition of the solid solution and precipitation of phases rich in this component. 2) Generalization of experimental data establishing the existence of preliminary redistribution of components both in unsaturated solid solutions before precipitation of a solid or liquid phase and in liquid solutions before their crystallization makes it possible to regard this process as a manifestation of a law which applies to all systems capable of undergoing transformations of the diffusion type. This law can be formulated as follows. If, as a result of a change in the composition or temperature, an alloy is in the stage preceding the formation of a new phase by a diffusion process, the components whose concentration in the new phase is higher than in the starting solution should concentrate in the regions of localized lattice defects (particularly grain-boundary regions) in the solid solution, or near the interphase boundaries in liquid solutions. This concept provides a basis for a better

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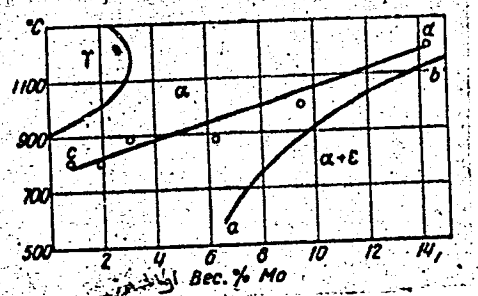
understanding of the nature of various diffusion-controlled phase transformations and makes it possible to elucidate the mechanism of various phenomena accompanying the heat-treatment of alloys such as the initial stage of the development of the tendency to inter-crystalline corrosion, temper-brittleness, dispersion-hardening, etc. 3) Establishment of the fact that orientated redistribution of composition is a process common to all alloys in the pre-precipitation stage leads to the conclusion that of all the theoretically possible ways in which the elements capable of affecting the nucleation process can aggregate, only that is possible in practice which is compatible with the constitution diagram, i.e. in which the regions of structural defects are enriched by those components which predominate in the new phase. There are 8 figures and 1 table.

SUBMITTED: March 19, 1962 (initially)
June 4, 1962 (after revision)

Redistribution of components S/126/63/015/003/008/025
E193/E383

Fig. 3:



Card 5/5

BRUK, B.I.

Interaction between carbon and non-carbide forming elements in iron alloys. Fiz. met. i metalloved. 16 no.2:217-224 Ag '63. (MIRA 16:8)

(Iron alloys—Metallography)
(Crystal lattices)

BRUK, Boris Il'ich; ZAV'YALOV, Andrey Sergeyevich; VOL'FE, L., red.

[Radioactive isotopes and nuclear radiations in metallurgy and machinery manufacture; textbook on the use of nuclear energy in the national economy] Radioaktivnye izotopyi iadernye izlucheniia v metallurgi' i mashinostroenii; uchebnoe posobie po primeneniiu adernoi energii v narodnom khoziaistve. Leningrad, Severo-Zapadnyi zaochnyi politekhn. in-t, Pt. 2. 1965. 173 p. (MIRA 19:1)

ACC NR: AM6032612 (N) Monograph UR/

Bruk, Boris Il'ich

Autoradiographic analysis of metals used in shipbuilding (Avtoradiograficheskoye issledovaniye metallov primenyayemykh v sudostroyenii) Leningrad, Izd-vo "Sudostroyeniye", 1966. 321 p. illus., biblio. 1400 copies printed.

TOPIC TAGS: autoradiography, ~~alloying element distribution,~~ iron alloy, aluminum alloy, magnesium alloy, zirconium alloy, ~~alloy autoradiographic investigation, metal autoradiographic investigation~~, SHIPBUILDING ENGINEERING, METAL ANALYSIS, METAL WELDING, METAL DIFFUSION

PURPOSE AND COVERAGE: This book is intended for scientific and engineering personnel of scientific research organizations and plants. It may also be useful for students of schools of higher education and aspirants specializing in physical metallurgy and the physics of metals. The book deals with problems of applying autoradiography for investigation of the structure and properties of metals and alloys. Information on physical fundamentals of this method and its experimental application is presented. On the basis of examples of numerous autoradiographic investigations, the possibility of using this method, its specific features, and efficient ways of applying autoradiography in metallurgy, metal study and welding are discussed. Particular attention is paid to autoradiographic study of structural materials used in ship-building and power machine fabrication. The author thanks Professor G. L. Petrov, Doctor of Technical Sciences, Professor B. B. Gulyayev and docent A. L. Rartuzhansky, Candidate

Card 1/4 UDC: 629.14.018.293.620.179.152

ACC NR: AM6032612

of Physical-Mathematical Sciences, and Professor V. S. Mes'rin, Doctor of Technical Sciences, for their assistance.

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ACC NR: AM6032612

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ACC NR: AM6032612

44. Effect of diffusion of carbon in the fusion zone on mechanical properties of welded joints -- 289

References -- 302

SUB CODE: 13/ SUBM DATE: 23May66/ ORIG REF: 260/ OTH REF: 114/

ANFILOV, A.A., inzh ; BAKALEYNIK, Ya.M., inzh.; BIRGER, G.I., inzh.; BRUK, B.S., inzh.; BUROV, A.I., inzh.; GINZBURG, V.L., inzh.; ZABELIN, V.L., inzh.; ZAPLECHNYY, Ye.G., inzh.; ISAYEV, D.V., inzh.; KLIMOVITSKIY, A.M., inzh.; KRYUCHKOV, V.V., inzh.; KOTOV, V.A., inzh.; LEYDERMAN, A.Ye., inzh.; PODGOYETSKIY, M.L., inzh.; SAZHAYEV, V.G., inzh.; SEVASTIYANOV, V.V., inzh.; FILIPPOV, S.F., inzh.; FROMBERG, A.B., inzh.; SHNEYEROV, M.S., inzh.; ERLIKH, G.M., inzh.; VERKHOVSKIY, B.I., red.; ZUBKOV, G.A., red.; KARKLINA, T.O., red.; OVCHARENKO, Ye.Ya., red.; ANTONOV, B.I., ved. red.

[New means of automatic and centralized control for nonferrous metal mines] Novye sredstva avtomatizatsii i dispetcherskogo upravleniia dlia rudnikov tsvetnoi metallurgii. Moskva, Nedra, 1965. 93 p. (MIRA 18:4)

ANISIMOV-SPIRIDONOV, D.D.; BRUK, I.S., otv. red.

[Method of linear branching and some of its applications in optimal planning] Metod lineinykh vetvlenii i nekotorye ego primeneniia v optimal'nom planirovanii. Moskva, Nauka, 1964. 116 p. (MIRA 18:1)

1. Chlen-korrespondent AN SSSR (for Bruk).

SOBOL', S.I.; NELEN', I.M.; SPIRIDONOVA, V.I.; BERLIN, Z.L; GORYACHKIN, V.I.; TARAKANOV, B.M.; SHKURSKIY, V.D.; Prinimali uchastiye: FREYMAN, A.K., inzh.; BRUK, B.M., inzh.; CHEBOTKEVICH, G.V., inzh.; OSPIN, V.G., inzh.; ALEKSANDROVA, N.N., laborant; SALTYKOV, I.B., laborant; TELKOVA, Ye.I., laborantka; TEPLYAKOV, Yu.M., laborant; GAVRILENKO, A.P., slesar'; KURGUZOV, A.S., elektrik; GAVRILOV, I.T., elektrik

Pilot-plant testing of the State Institute of Nonferrous Metals flow sheet for the autoclave retreatment of copper-molybdenum intermediate products. Sbor. nauch. trud. Gintsvetmeta no.19:319-339 '62. (MIRA 16:7)

(Nonferrous metals—Metallurgy)
(Leaching)

SHVARTS, A.M.; TRAKHTENGERTS, E.A.; BRUK, B.N.; PURTO, V.A.; FISHKINA, V.L.

Experience in literal translation of patent literature from the English language by the "Strela-3" computer. NTI no.2:42-45 '63. (MIRA 16:11)

TRAKHTENGERTS, E.A.; BRUK, B.N.; LOVETSKIY, S.Ye.

Experience with machine translation of special technical texts with partial grammatical agreement. NTI no.11:25-30 '63. (MIRA 17:2)

8(2)

AUTHORS: Tsfasman, S. B., Bryksin, I. Ye., Bruk, B. S.

SOV/32-24-11-28/37

TITLE: An Automatic Polarographic Concentration-Measuring Device (Avtomaticheskiy polyarograficheskiy kontsentratomer)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 11, pp 1409-1414 (USSR)

ABSTRACT: A detailed derivation of the equations of alternating current polarograms was given by Delakhey (Ref 5). According to polarographic theory (Refs 6, 7) the peak of the alternating current polarogram determines with its coordinates the composition of a single-component solution (Diagram). If there are several components, there are correspondingly more maxima and each maximum determines the character and concentration of its component (Diagram). From the above equations it becomes obvious that the corresponding tension of the half period can be determined in the cell, if the qualitative composition of the solution is known. If a continuous change of the maximum amplitude of the alternating current occurs, also a continuous determination of the quantitative composition must be possible. Basing on these

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considerations, the device described was developed, which can be used for continuous determinations of concentrations or as an alternating current polarograph. In the first instance, a measuring unit (Sketch) is used through which the liquid to be tested flows. In collaboration with V. D. Yemel'yanov, Chief Operator of the KIP konstruktorskoye byuro "Tsvetmetavtomatika" (KIP Designing Office of the "Tsvetmetavtomatika"), an experimental type of this measuring device (Pattern) was produced and tested under laboratorial and industrial conditions for both above possibilities. Polarograms of 1 mg/l Cd in the presence of 200 mg/l Cu and 1 mg/l Cd without Cu are given as examples. The measuring error is quoted as 1.5 % and 2 % respectively. The industrial tests were performed in the "Elektrotsink" plant. A zinc-electrolyte was tested as to cadmium. The device was calibrated by means of a polarograph of the TsLA type. The measuring error was found to be $\pm$ 4 %. There are 6 figures, 2 tables, and 7 references, 3 of which are Soviet.

An Automatic Polarographic Concentration - Measuring Device SOV/32-24-11-28/37

ASSOCIATION: Konstruktorskoye byuro "Tsvetmetavtomatika" (Designing Office "Tsvetmetavtomatika")

Card 3/3

BRUK, B. Ye.

Bruk, B. Ye. "Operation of plastic splintering of amputated mangled appendages of the forearm according to Krukenberg," Trudy Leningr. obl. gospitalya dlya lecheniye invalidov Otechestv. voyny, Leningrad, 1948, p. 47-54

SO: U-3850, 16 June 53 (Letopis 'Zhurnal 'nykh Statey, No. 5, 1949)

BRUK, B. Ye.

Bruk, B. Ye. "Data on the problem of bilateral multiple "marching foot" (Detchlander disease)," Trudy Leningr. obl. gospitalya klya lecheniye invaladova Otechestv. voyny, Leningrad, 1948, p. 61-74

SO: U-3850, 16, June 53 (Letopis 'Zhurnal 'nykh Statey, No. 5, 1949)

BRUK, B.E.

M.I.Sitenko, his role in the development of Russian orthopedics, traumatology and prosthetics. Vest.khir.Grekova 70 no.5:76-79 1950. (CLML 20:5)

1. Leningrad.

BRUK, E.; SKOPINSTEV, B.

Recovery of coagulants; results of laboratory experiments. Tr. from the Russian. p. 124.
-a-. Use of compressed air in water-purification installations. p. 126.

Vol. 35, no. 4, Apr. 1956
VODA
Praha, Czechoslovakia

Source: East European Accession List. Library of Congress
Vol. 5, No. 8, August 1956

BRUK, E. L.; MOTIN, Yu. D.; OZEROV, I. M.; POLOZOV, V. F.

Suitability of the sandstone of the oil shale interlyaers of the Gdov field for the production of portland cement. Trudy VNIIT no. 11:168-178 '62. (MIRA 17:5)

BRUK, E.S.; VAYNER, Ya.V.

Modern equipment for the application of protective coatings. Mashinostroitel' no.5:21-27 My '61. (MIRA 14:5)
(Protective coatings—Equipment and supplies)

PHASE I BOOK EXPLOITATION SOV/3693

Bruk, Emmanuil Solomonovich

Usovershenstvovaniye tekhnologii tsinkovaniya slozhnoprofilirovannykh detaley (Improvement of the Method of Galvanizing Intricately Shaped Parts) Leningrad, 1958. 13 p. (Series: Informatsionno-tekhnicheskiy listok, No. 63, Zashchitnyye pokrytiya metallov) 6,200 copies printed.

Ed.: V.I. Zhukova, Engineer; Tech. Ed.: T.B. Klopova.

Sponsoring Agency: Leningrad. Dom nauchno-tekhnicheskoy propagandy, and Obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy RSFSR.

PURPOSE: This booklet is intended for technical personnel interested in methods of electroplating machined parts of intricate shape.

COVERAGE: The author points out that the widely used cyanogen electrolytes recommended in the literature are not suitable for conditions prevailing in Soviet industry. Experiments conducted to find cyanogen galvanizing electrolytes with higher dispersive capacity than the electrolytes presently used in

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most Soviet factories have resulted in a new method of galvanizing machined parts of intricate shape on a mass production basis. The experiments are described and a diagram of the apparatus is given. The new method makes it possible to replace the old method of double-coating machined parts with a tin-copper coating method resulting in important economies in nonferrous metals, and increased work efficiency. The author also discusses the greater chemical stability of zinc platings, simultanecus chemical polishing and chromate treatment of electroplatings, and the phosphating of zinc electroplatings. He concludes that electrolytes with high NaOH concentration in relation to NaCN have high dispersive and plating capacity. Low CN-content electrolytes are stable under mass production conditions and have low toxicity. P.S. Titov, N.N. Boldanova, A.T. Vagramyan, and N.T. Kudryavtsev are mentioned in connection with their work in this field. There are 11 references, all Soviet.

TABLE OF CONTENTS: None given.

AVAILABLE: Library of Congress

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TM/mas
6-7-60

BRUK, E.S.; GOL'BERG, I.G.; SMIRNOV, A.I.

Unit for electroplating. Mashinostroitel' no.6:26 Je '61. (MIRA 14:6)

(Electroplating—Equipment and supplies)

IL'IN, Vitaliy Alekseyevich; BRUK, E.S., inzh., retsenaent; VYACHESLAVOV, P.M., kand. khim.nauk, dots., red.; GRILIKHES, S.Ya., kand.tekkhn. nauk, red.; YAMPOL'SKIY, A.M., inzh., red.; MITARCHUK, G.A., red. izd-va; BARDINA, A.A., tekhn. red.

[Zinc and cadmium plating]TSinkovanie i kadmirovanie. Pod red. P.M.Viacheslavova. Izd.2., dop. i perer. Moskva, Mashgiz, 1961. 48 p. (Bibliotechka gal'vanotekhnika, no.2) (MIRA 16:2)
(Zinc plating) (Cadmium plating)

CHEBOTAREVA, Iraida Ivanovna; SIDEL'NIKOVA, Natal'ya Sergeyevna;
BRUK, E.S., red.; SHILLING, V.A., red.izd-va; BELOGUROVA,
I.A., tekhn. red.

[Introducing the industrial use of electroplated coatings of
tin-nickel alloys] Opyt proizvodstvennogo vnedreniia gal'va-
nicheskogo pokrytiia splavom olovo-nikel'. Leningrad, 1962.
20 p. (Leningradskii dom nauchno-tekhnicheskoi propagandy.
Obmen peredovym opytom. Seriia: Zashchitnye pokrytiia metal-
lov, no.9) (MIRA 16:3)
(Electroplating) (Tin-nickel alloys)

GOL'BERG, Iosif Grigor'yevich; BRUK, E.S., red.

[Universal laboratory electroplating system] Universal'naia laboratornaia ustanovka dlia gal'vanopokrytii. Leningrad, 1964. 13 p. (MIRA 17:9)

SOV/27-59-4-22/28

22(1)

AUTHORS: Bruk, F., Instructor, and Golinskiy, B., Candidate of Physico-Mathematical Sciences

TITLE: Bibliography. A Valuable Aid

PERIODICAL: Professional'no-tekhnicheskoye obrazovaniye, 1959, Nr 4, p 31 (USSR)

ABSTRACT: The authors review a book on problems in the fundamentals of engineering mechanics compiled by I.Ya. Shtayerman and A.I. Gal'perin, published by Trudrezervizdat in 1958. They also refer to other textbooks published in recent years and composed by Levinson, Mitinskiy and Movnin, Bychkov and Mirov.

Card 1/1

1. BRUK, G. E., Eng.

2. USSR (600)

4. Lacquer and Lacquering

7. New asphalt-bitumen lacquer for metal constructions. Elek. sta. 24, No. 1, 1953.

9. Monthly List of Russian Accessions, Library of Congress May 1953

BRUK, G.L.

"The ceramic industry in the USSR and the outlook for its development," Authors: A.S. Berkman, G.L. Bruk, A.T. Gel'man (et al.), in symposium: Syr'yevyye resursy tonkokeram. prom-sti SSSR i puti ikh ispol'zovaniya, Moscow-Leningrad, 1948, p. 7-32

SO: U-2888, Letopis Zhurnal'nykh Statey, No. 1, 1949

ACCESSION NR: AP3008536 S/2984/63/000/000/0013/0016

AUTHORS: Zhurkin, N. S.; Konshin, V. M.; Bruk, G. L.

TITLE: Control system for the 2.6 m telescope

SOURCE: Novaya tekhnika v astronomii; materialy* soveshch. Komissii priborostroyen. pri Astronom. sovete AN SSSR, Moskva, 18-20 apr. 1961 g. Moscow, Izd-vo AN SSSR, 1963, 13-16

TOPIC TAGS: control system, automatic control, telescope, EMU 12A motor, MI 32T motor

ABSTRACT: The basic problems of this system were worked out in 1959 at the Kry*mskaya astrofizicheskaya observatoriya AN SSSR (Crimean Astrophysical Observatory AN SSSR). The system involves the following devices: 1) a central panel for automatic and semiautomatic control, 2) a computer for refraction correction, coordinate computation, conversion of equatorial to altazimuth coordinates, and final determination of corrected position, 3) generator of stable frequency for controlling hour-angle rotation, 4) auxiliary panel for semiautomatic control of dome, and 5) auxiliary control apparatus for directing observer's platform. Movement of the telescope for automatic orientation is effected by means

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ACCESSION NR: AP3008536

of EMU-12A and MI-32T DC motors at a rate of 1 deg/sec with a positioning accuracy of ± 15 seconds of arc. For semiautomatic orientation, coarse adjustment is made at the same rate, finer adjustment may be varied smoothly from 600 down to 12 seconds of arc per second, and the finest correction may be varied from 12 down to 0.5 seconds of arc per second. The observer's platform permits any part of the telescope to be reached easily, the movements being controlled by the operator through the semiautomatic panel. All controls may be handled by a single operator. The computer is completely automatic, and the main panel, auxiliary panel, and observer's platform are interconnected by a telephone system.

ASSOCIATION: GOMZ

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Card 2/2

BRUK, G. N.

PA 239T64

USSR/Engineering - Refractories, Control Instruments Aug 52

"Device for Remote Check of Bunker Load," G. N. Bruk, Engr, Leningrad Inst of Refractories

"Ogneupory" No 8, pp 381-382

Suggests new device, consisting essentially of two electromagnets, for registering level of loose materials in bunkers. Depression extent of rubber membrane inside of bunker depends on height of load over membrane, whose deflection is transferred to core of first electromagnet. System of two induction coils synchronizes this movement with core movement in

239T64

second magnet installed on control panel. Indicator attached to this core travels along scale graduated for various levels of material in bunker.

239T64

BRUK, G.N.

Safety devicd for presses with rotary tables
Ogneupory 17 no.4, 1952

BRUK, G. N.

1 Automatic weighing plate-feeder. G. N. Bruk. *Ogneupory* 1953, No. 1, 42-4; *Referat. Zhur., Khim.* 1954, No. 43676.—The plate-feeder for granular materials is electronically controlled. IN

M. Hosh

BRUK, G.N.

PHASE I BOOK EXPLOITATION SOV/4252

Akademiya nauk SSSR. Sovet po izucheniyu proizvoditel'nykh sil

Chernaya metallurgiya (Ferrous Metallurgy) Moscow, Izd-vo AN SSSR, 1960. 275 p. (Series: Razvitiye proizvoditel'nykh sil Vostochnoy Sibiri) Errata slip inserted. 2,000 copies printed.

Ed.: G.I. Lyudogovskiy, Candidate of Technical Sciences; Ed. of Publishing House: G.M. Makovskiy; Tech. Ed.: Ye.V. Makuni; Editorial Board of this vol.: S.S. Dvorin, N.V. Ovchinnikskiy, Candidate of Technical Sciences, A.N. Pokhvisnev, Doctor of Technical Sciences, and A.A. Fedotov, Engineer; Editorial Board of Series: I.P. Bardin, (Deceased), Academician, Academy of Sciences USSR (Chief. Ed.); M.A. Lavrent'yev, Academician, Academy of USSR; S.I. Vol'fkovich, Academician, Academy of Sciences Academician, Academy of Sciences USSR; V.I. Dikushin, Sciences USSR; V.I. Veyts, Corresponding Member, Academy of Sciences USSR; O.D. Levitskiy, Corresponding Member, Academy of Sciences USSR; N.N. Nekrasov, Corresponding Member, Academy of Sciences USSR; L.B. Pustovalov, Corresponding Member, Academy of Sciences USSR; T.S. Khachaturov, Corresponding Member, Academy of Sciences USSR; N.F. Rostovtsev, Academician, All-Union Academy of Agricultural Sciense; A.N. Popov, Member, Academy of Building and Architecture USSR; L. Ye. Grafov, Deputy Chairman, State Planning Committee of the Council of Ministers RSFSR; A.D. Gashev, Member, State Planning Committee of the Council of Ministers RSFSR; A.Ye. Probst, Professor; V.F. Vasyutin, Professor; V.A. Krotov, Professor; P.V. Vasil'yev, Doctor of Economics; G.I. Lyudogovskiy, Candidate of Technical Sciences; P.A. Letunov, Candidate of Geology and Mineralogy; and M.G. Shkol'nikov, Candidate of Economics.

PURPOSE: This collection of papers is intended to furnish information on industrial resources in Eastern Siberia and to provide a basis for future developmental planning in the field of ferrous metallurgy.

COVERAGE: The collection is a summary of the proceedings of the Ferrous Metallurgy Section of the Joint Conference of Representatives of the Academy of Sciences USSR, the State Planning Commission, and the Council of Ministers RSFSR on the Development of the Industrial Resources of Eastern Siberia. The collection deals with four main areas of development in Eastern Siberia: 1) Mineral resources, 2) the fuel base, 3) prospects for the development of ferrous metallurgy, and 4) problems in the development of electrometallurgy. A list of the 112 members of the Section with their affiliations is given in the Appendix. References accompany several of the articles.

Card 4/8

BRUK, I.; MAKEYEV, A.

Nurses' conference. Zdrav. Bel. 6 no.12:67 D '60. (MIRA 14:1)
(MINSK PROVINCE—NURSES AND NURSING)

BRUK, I. I.

PA 4T46

USSR/Gas
Metals - Heat treatment

Apr 1947

"Use of the Heat of Escaping Gases in Metallurgical Plants," I. I. Bruk, 3 pp

"Za Ekonomiyu Topliva" Vol IV, No 4

A critique of a system proposed by B. V. Sazanov in the May-June issue of subject journal. It is rejected on the ground that it requires more metal than other systems.

4T46

BRUK, I.I.

4

9562* Raising the Economic and Productive Efficiency of Open-Hearth Furnaces by Installation of Waste-Heat Boilers and Evaporation Cooling Systems. Povyshenie ekonomichnosti i proizvoditel'nosti martenovskikh pechei putem vnedreniia kotlovutilizatrov i sistem isparitel'nogo okhlazhdeniia. (Russian.) I. I. Bruk. *Metallurg*, 1956, no. 2, Feb. 1956, p. 17-22. Heat-saving characteristics of waste-heat boilers and of evaporation-cooling systems in open-hearth furnaces. A complex installation for simultaneous utilization of heat from flue gases and furnace elements subjected to cooling. Diagrams, table.

BRUK, I. I.

137-1957-12-23256

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 12, p 58 (USSR)

AUTHOR: Bruk, I. I.

TITLE: The Design of the KU-80 Recovery Boiler and Suggestions for Its Improvement (Konstruktsiya kotla-utilizatora KU-80 i predlozheniya po yego usovershenstvovaniyu)

PERIODICAL: V sb.: Kotly-utilizatory martenovsk. pechey. Moscow, Metallurgizdat, 1957, pp 13-26

ABSTRACT: A recovery boiler with forced circulation, the first in the USSR, was installed in 1947 at the "Serp i molot" plant to operate with an open-hearth furnace of 70 t capacity. Based on the operational data of this boiler a number of KU-80 boilers was designed for the utilization of 80-100 thousand nm^3 of flue gases at an initial temperature of up to 600-700°. The maximum steam generating capacity of the boiler is 15 t/hr, the steam pressure is 17 atm (gauge) the temperature of the superheated steam is 375°. The heating surfaces of the steam superheater, the evaporating coils and the water economizer are 84.2 m^2, 778 m^2, and 216 m^2 respectively. The evaporating surface is composed of 72 double coils.

Card 1/2

137-1957-12-23256

The Design of the KU-80 Recov. Boiler and Sugg. for Its Improv.

A mixed system is employed for the evaporation surface: 2/3 of the length of the coils is connected in parallel and 1/3 in a counterflow arrangement. The internal diameter of the boiler barrel is 1500 mm; for the purposes of separation of the steam it houses a perforated sheet and six cyclones. The circulation pump has a capacity of 90-140 m^3/hr, a pressure rise of 2.5 - 3.8 atu, and a power rating of 15.3 - 23.8 kw at 1450 rpm. The heating surfaces are cleaned by water and by superheated steam. To prevent the formation of flakes, two burners operating on small amounts of coke gas are installed in series in the flue which connects the boiler and the regenerator.

Ye. N.

1. Boilers-Design 2. Boilers-Characteristics

Card 2/2

Bruk, I. I

137-58-5-9103

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 51 (USSR)

AUTHOR: Bruk, I. I.

TITLE: Design and Construction of Heat-recovery Boilers Operating in Conjunction with Open-hearth Furnaces and Means for Increasing Their Effectiveness (Opyt konstruirovaniya i proyektirovaniya martenovskikh kotlov-utilizatorov i puti povysheniya ikh effektivnosti)

PERIODICAL: Tr. Nauchno-tekhn. soveshchaniya po ispol'zovaniyu vtorichnykh energ. resursov. Moscow-Leningrad, Gosenergoizdat, 1957, pp 89-100

ABSTRACT: A description of the design of a heat recovery boiler (HRB), KU-80/100, intended for operation in conjunction with open-hearth furnaces of 350-500 t capacity and capable of passing 80, 000 nm^3/hr of waste gases; the nominal steam generating capacity of the HRB is 16.5t/hr, the maximum capacity being 20t/hr. The steam pressure amounts to 18-40 atm. abs., and the temperature of superheating to 350-450°C. Cleaning of heating surfaces is accomplished by steam blasting and washing with water. In order to prevent an explosion of the gas mixture within

Card 1/2

137-58-5-9103

Design and Construction (cont.)

the HRB, two burners in series are installed in the flues leading to the HRB. Provisions are included which make it possible to connect the equipment being cooled in parallel to the HRB.

Ye. N.

1. Boilers--Design 2. Heat transfer--Measurement

Card 2/2

BRUK, I.I., inzh.

New designs of waste-heat boilers and equipment for cleaning their heating surfaces. Trudy NTO chern. met. 20:279-297 '60.
(MIRA 13:10)

1. TSentroenergochermet.
(Boilers)

BRUK, I.I., inzh.; KON, M.L., inzh.; PETROV, N.V., inzh.

Performance of the steam superheaters of coiler Martenov waste-heat boilers. Prom.energ. 17 no.5:16-21 My '62. (MIRA 15:5)
(Boilers) (Superheaters)